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FIG. 22 illustrates another embodiment of probe working end 660 that utilizes the same principles in a tissueclamping arrangement. The working end again defines an engagement plane 625 that has a conductive surface
engagement portion 640A comprising a plurality of axial conductive strips. Also exposed in the engagement plane are
portions of the compressible medial conductive portion 640B. Again, the medial conductive portion 640B is siliconebased PTC-type material as described above in relation to FIGS. 8-13, and 20-21. (Alternatively, the surface 625 can be
a thin microporous metallic coating). FIG. 22 shows a core conductive portion (electrode) 640C covered by the medial
conductive portion 640B. The core conductive portion 640C is coupled to electrical source 150A and controller 150B, as
described previously. The embodiment of FIG. 22 has the medial conductive portion 640B coupled to a lumen (not
shown) that is adapted to deliver saline flow from fluid source 642.

The probe working end 660 has a first jaw portion 672a that carries the above described functional components of the invention attached to any suitable jaw body indicated at 668. The jaw body 668 is of an insulated material or a metal with a non-conductive coating. The second jaw portion 672b is moveable about a pivot (not shown) to close against the first jaw 672a as indicated by the arrow in FIG. 22. The tissue-engaging surface of the second jaw portion preferably is a non-conductive material. Any suitable jaw opening-closing mechanism known in the art can be used with either one both jaws being actuatable from an instrument handle. It can be understood that by closing the jaws to clamp a targeted tissue volume therebetween, the silicone-based medial conductive portion 640B will compress inwardly, depending on the density selected. If the open cells of the medial conductive portion 640B are collapsed to any substantial extent as the jaws are compressed, the flow of saline through medial conductive portion 640B will be restricted thus altering the temperature coefficient of resistance of the medial conductive portion 640B. FIGS. 23A-23B illustrate schematically the potential for fluid flow through the medial conductive portion 640B, with FIG. 23A indicating that open cells 674 allow fluid flow therethrough. It can be easily understood from FIG. 23B that a compression of medial conductive portion 640B can collapse the cells 674 which in turn will restrict fluid flow. Thus, the system can be designed with (i) selected conductive doping of medial conductive portion 640B and (ii) selected conductivity of the saline solution to optimize the temperature coefficient of the material under different compressed and uncompressed conditions for any particular thermally-mediated therapy. The medial conductive portion 640B can be designed to be a

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positive or negative temperature coefficient material (defined above) as the material expands to a repose shape after being compressed. For example, one thermal treatment using the jaws of FIG. 22 can be to seal or coagulate engaged tissue. The resilient engagement surface 625 can naturally expand to remain in substantial contact with the tissue surface as the tissue is sealed and dehydrates and shrinks. At the same time, the cell structure of the medial conductive portion 640B would tend to open to thereby increase fluid flow the engagement plane, which would be desirable to maintain active and passive conductive heating of the tissue. Also at the same time, the selected temperature coefficient of the medial conductive portion 640B in combination with the saline volume therein can insure that active Rf heating is modulated as exactly described in the Types "A" and "B" embodiments above with any selected switching range.

7. Type "F" probe for energy delivery to tissue. FIG. 24 illustrates alternative a Type "F" probes 700 that correspond to the invention. The working end of the probe differs from the Type "A" embodiment, for example, in that an additional control mechanism is added to the system. FIG. 24 shows a needle-type probe member 720 that defines engagement plane 725 extending about its distal surface. The conductive surface engagement portion 740A and medial conductive portion 740B are as described previously. The medial conductive portion 740B again is a PTC-type material adjacent the core conductive (electrode) 740C. In this embodiment, referring to FIG. 24, the system has independent (insulated) electrical leads 745a and 745b extending through the probe that are coupled to medial conductive portion 740B. The leads are connected to a DC source 750 and controller 150B.

The purpose of the DC delivery application mechanism is to provide independent control means for modulating the temperature of medial conductive portion **740B**. The DC system can be used to instantly alter the temperature of a PTC or NTC material, for example, to terminate Rf energy application or for other similar control purposes. Another purpose of such a DC system would be to shift the switching range to a higher or lower range. Another embodiment (not shown) can use photonic energy application means to alter the resistance of an optically sensitive medial conductive layer **740B** for similar purposes.

6. Type "G" probe for energy delivery to tissue. FIGS. 25 and 26 illustrate the working end of a Type "G" probe 800 corresponding to the invention. The probe again is adapted for controlled energy delivery to tissue utilizing a

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variably resistive matrix that is dependent on its temperature—but this embodiment comprises the working end 822 of a probe (e.g., a catheter) that is adapted for introduction into a lumen, space, or cavity in or about the patient's body. The working end defines an engagement plane 825 that extends around the circumference of the probe. The embodiment of FIG. 25 has a conductive surface portion 840A that overlies the variably resistive matrix indicated at 840B. The core electrode 840C can be a flexible conductive tube or wire, or a flexible polymer with a metallic coating that serves as an electrode. While the probe 800 is shown as being flexible for endoluminal navigation, the probe shaft also can be rigid for introducing into a joint capsule or similar body space.

The Type "G" probe is adapted for operation in an environment in which the targeted tissue tt is exposed to fluid environment, wherein the term fluid is defined as any flowable media such as a liquid or a gas. The variably resistive matrix 840B can be a positive temperature coefficient material (PTC) or a negative temperature coefficient material (NTC), depending on the operating environment. Either a PTC or NTC material has the characteristic that its temperature—and therefore its selected switching range—can extend over only a highly localized portion of the working end. Thus, in operation, one portion of the variably resistive matrix 840B can be substantially resistive while another portion can be substantially conductive.

As one example of such a Type "G" probe, FIG. 25 depicts the working end 822 in a patient's heart in a catheter ablation treatment to correct an arrhythmia. Supraventricular tachycardia (SVT) is a general term describing any rapid heart rate originating above the ventricles, or lower chambers of the heart. SVT is an arrhythmia, or abnormal heart rhythm, that includes atrial fibrillation, AV nodal re-entrant tachycardia, and Wolff-Parkinson-White syndrome. SVT can occur for a number of reasons, including abnormalities of the heart's electrical conduction system. Rf catheter ablation can correct an arrhythmia by creating lesions, for example, in the atrial wall to eliminate alternate conductive pathways in the heart that interfere with the normal conduction pathways. The objectives of such an Rf ablation are to create a full-depth lesion in the targeted wall with as little collateral damage as possible. Further, it is important that such Rf ablation does not char the tissue or coagulate blood which can create embolic material. Such emboli can migrate downstream and cause a stroke or other ischemic event.